

## ABSTRACT

A multilayer system and its production. Multilayer systems, such  
5 as those used as mirrors in the extreme ultraviolet wavelength range;  
suffer contamination or oxidation during storage in air and in long-time  
operation, i.e. when exposed to EUV radiation in a vacuum environment  
with certain partial pressures of water or oxygen, which causes a serious  
reduction in reflectivity. The multilayer system according to the invention  
10 will have a long life with constantly high reflectivity. Their reflectivity can  
be enhanced by barrier layers. The multilayer systems according to the  
invention have protective layers comprising iridium. The multilayer  
systems according to the invention are produced by direct, ion-beam-  
supported growth of the respective layer. The multilayer systems  
15 according to the invention are not only resistant to contamination and  
oxidation, but can also be cleaned if necessary, without losing reflectivity.  
Because of their long life with constantly high reflectivity, they are  
particularly suitable for use in semiconductor lithography in the soft X-ray  
range or extreme ultraviolet wavelength range.